

Evidence for Rapid Evolution in Grasslands

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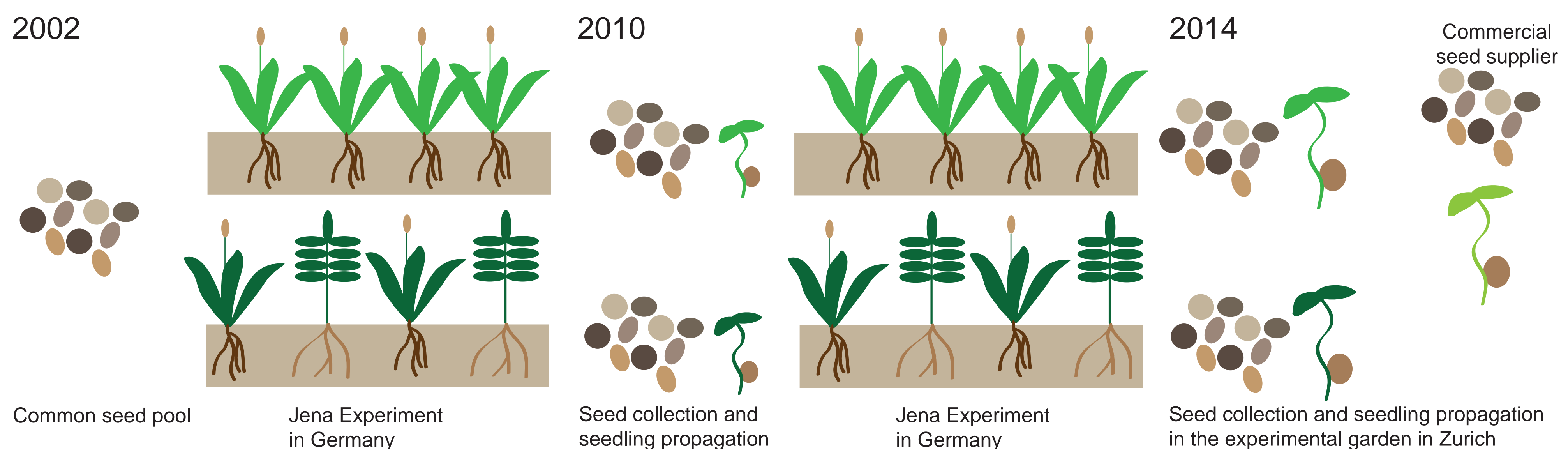
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In long-term grassland biodiversity experiments the **positive effect of biodiversity on plant productivity commonly increases with time**. Previously it was shown that differential selection in monoculture and mixed species grassland communities could lead to the **rapid emergence of monoculture and mixture phenotypes** (Zupping-Dingley *et al.*, 2014). We hypothesized that in biodiversity experiments **pre-adapted genotypes or epigenetic variants could be sorted out** from the standing genetic or epigenetic variation.



A Plant histories



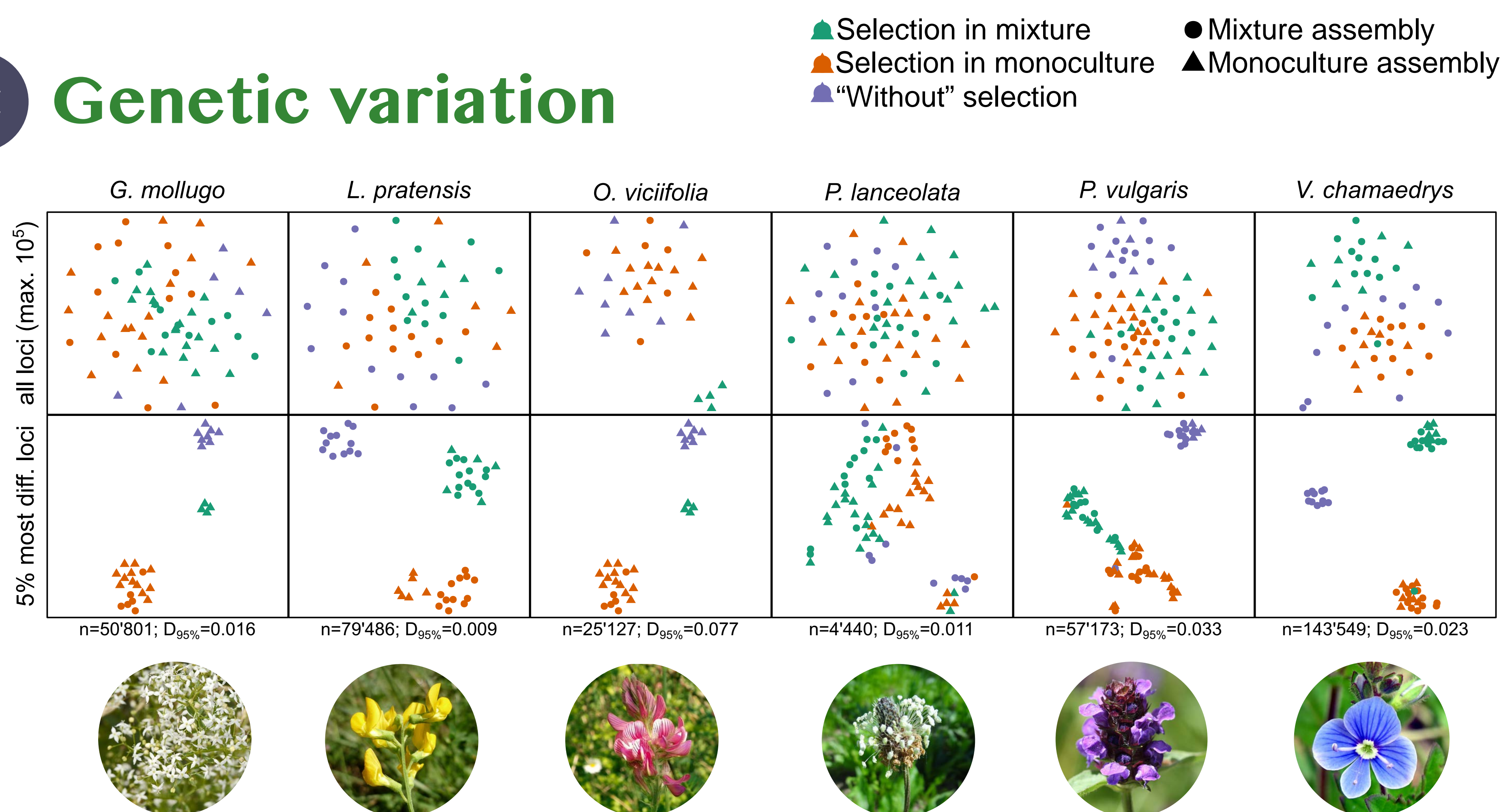
B Glasshouse experiment



To test if biodiversity acted as selective environment, we grew **offspring from plants that were exposed for twelve years to monoculture or mixture environments** in the Jena Experiment **A** under controlled glasshouse conditions. **B**

We used **epiGBS**, a genotyping by sequencing approach combined with bisulphite conversion to **provide integrative genetic and epigenetic data** (van Gorp *et al.* 2015).

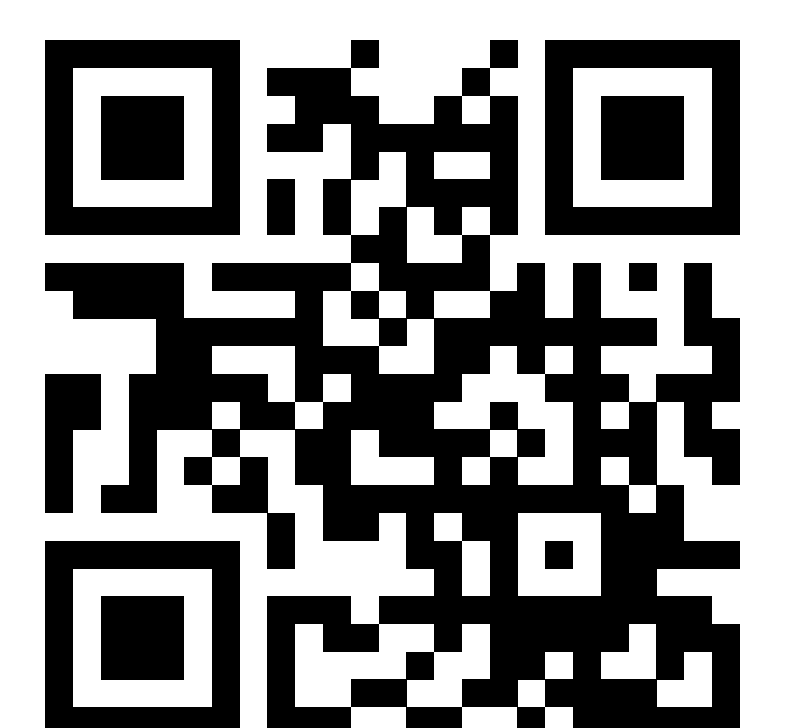
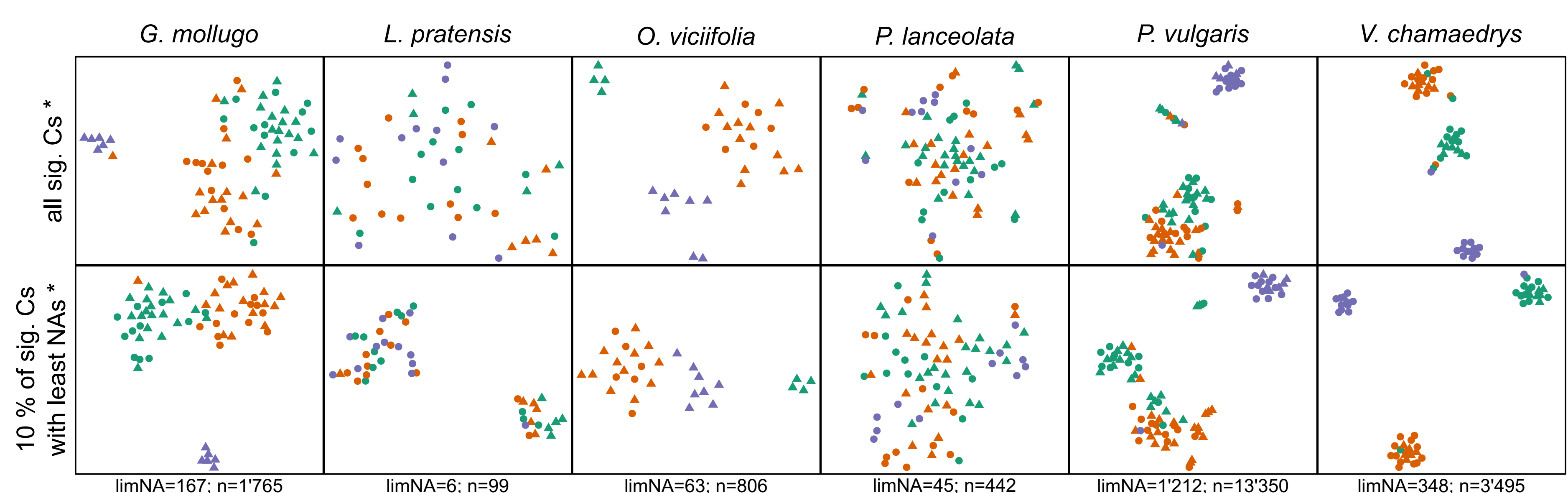
C Genetic variation



We found evidence of rapid genetic divergence in grassland species.

Our data reveal a strong correlation between genetic and epigenetic variation and suggest **genetic variation C** as driving force of most epigenetic variation. **D** This pattern was consistently observed across different plant species. These results suggest that, in perennial grassland species, **selection of genetic variation underlies the rapid emergence of monoculture and mixture types**.

D Epigenetic variation



Want to know more? Please get in touch!

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